



EFFECTIVENESS OF 7 WEEK OF RATSCHOW EXERCISE V/S BUERGER EXERCISE ON ANKLE BRACHIAL INDEX IN PATIENTS WITH PERIPHERAL ARTERIAL DISEASE – A PILOT STUDY

Dr. Gauri M. Afle

Professor, Department of Cardiovascular and Respiratory Physiotherapy, Modern College of Physiotherapy, Pune,

Sakshi Baiche*

Intern, Modern College of Physiotherapy, Pune, *Corresponding Author

ABSTRACT **Background:** Peripheral Arterial Disease (PAD) is narrowing or blockage of arteries with the accumulation of fatty tissues and plaque, known as atherosclerosis commonly referred as poor circulation of blood flow to arms and legs. Lower Extremity Exercise helps to re-establish collateral blood flow to the leg. Left Untreated PAD, blood starved tissue can become infected or die, a condition called gangrene, and in the worst cases, may result in the need for amputation. Participants with PAD were selected. All the participants were assessed with ankle brachial index. Seven week of Ratschow and Buerger exercise were given. Pre and post intervention data were collected. The pre and post values were compared and analyzed using instat graph pad, which concluded that Buerger exercise is more effective in Ratschow exercise in patients with PAD

KEYWORDS : Ratschow Exercise, Buerger Exercise, Ankle Brachial Index, Peripheral Arterial Disease.

INTRODUCTION

Peripheral Arterial Disease refers to any disease of the circulatory system outside of the brain and heart. PAD is narrowing or blockage of arteries with the accumulation of fatty tissues and plaque, known as atherosclerosis commonly referred as poor circulation of blood flow to arms and legs. Although the term PAD can include any disorder that affects any of the blood vessels, it often is used as a synonym for "Peripheral Vascular Disease".²

Peripheral Arterial Disease affects the lower extremities more commonly than the upper extremity vessels.^{1,2} Patients with PAD may experience classic claudication, atypical leg pain, rest pain, ischemic ulcers, repeated hospitalizations, revascularizations and limb loss.² These lead to a poor quality of life and high rate of depression.

PATIENTS COMPLAIN -

- Leg cramping
- Leg numbness
- Hard to walk
- Pain even in rest
- Changes in the color of leg

Even patients who have leg symptoms because of poorer functional activity, poor quality of life, smaller calf muscle area and greater calf muscle fat which leads to lower limb arterial insufficiency. The periodic contraction of the gastrocnemius muscle significant improvement in calf muscle pump function. Research has shown that exercise can be highly effective in increasing leg circulation and reducing the pain that accompanies activity. Various exercises and various treatment have been effective in PAD.

METHOD AND MATERIAL

Subjects:

The study began after receiving ethical clearance from P.E.S Modern college of Physiotherapy, Pune. Eight participants were selected, according to the inclusion and exclusion criteria, from clinics in and around Pune.

The inclusion was: Age (40 to 80) males and female, ABI - Ranges < 0.9. Participants with any kind any recent surgery, fracture, trauma of lower limb and spine (past 6 months), Skin Infection, Open Wound, Diagnosed with foot ulcer and gangrene, Cardiorespiratory condition, Musculoskeletal and Neurological deficits were excluded. The whole study were explained to the participants and written informed consent was taken from all the participants.

Prior assessment of ABI was done.

Group A were given Ratschow Exercise with Conventional Exercise and Group B were given Buerger Exercise with Conventional Exercise.

After 7 week post assessment of ABI was done and Data analysis was done.

Ankle Brachial Index¹²:

Lie the patient in supine position as possible for 20 minutes. This allow the leg muscle to relax and equalises the blood Pressure. Assess the systolic blood pressure in each limb using with automatic blood pressure device. Document each SBP on the ABI chart were done.

Protocol: GROUP A - Ratschow Exercise + Conventional Exercise
GROUP B - Buerger Exercise + Conventional Exercise
Ratschow and Buerger Exercise of 15 mins along with the Conventional protocol of 45 mins were given for 7 weeks.

RATSCHOW EXERCISE⁶

Placing the extremities in 2 position -

FIRST POSITION: Patient lies supine with legs elevated and supported at a 45 to 60 degree angle. Maintained position for until blanching (appears dead white) of the extremity occurs while doing actively dorsiflexion and plantarflexion of the feet.

SECOND POSITION: The legs are then lowered below the level of the rest of the body until the redness appears.

BUERGER EXERCISE⁶:

Placing the extremities in 3 position -

FIRST POSITION - Patient lies supine with legs elevated and supported at a 45 to 60 degree angle. Maintained position for 2-3 minutes, or until blanching (appears dead white) of the extremity occurs while doing actively dorsiflexion and plantarflexion of the feet.
SECOND POSTION- Sitting on the edge of the bed with the legs relaxed and dependent, the patient exercise the feet and toe (upward + downward, inward + outward) for about 3-5 minutes.

THIRD POSITION- Patient lies flat with feet covered with warm blanket and the exercise lasts for about 3-5 minutes.

CONVENTIONAL EXERCISE¹²:

For 2 weeks- 3 sets 10 repetitions for next 5 week-3 set 20 repetitions were given.

1-2 week:

Isometric Exercise - Quadriceps sets, Hamstring sets

AROM - Ankle pump, Heel slide, heel and toe raises in sitting
Ambulation - ¼ - ½ miles or just prior of claudication

3-4 week:

AROM and resistive exercise and add to above exercises -

Standing toe raises, straight leg raises, wall squat; hip, knee and ankle exercises with theraband.

Ambulation - ½ - 1 mile or to point of claudication

5-7 Week:

Continue resistive exercises increase resistance as tolerated
Ambulation - 1 + miles or distance as tolerated

DATA ANALYSIS:

The statistical analysis for this study was done using the software "instat graph pad". Statistical test used was paired t test in pre post ratschow and buerger exercise. The post ratschow and buerger exercise was done by unpaired t test. The table below shows the data analysis and their interpretation.

Descriptive Statistics			
	Mean	Std Deviation	P value
Pre Ratschow Exercise	0.7750	0.08851	0.0219
Post Ratschow Exercise	0.8500	0.1052	0.0219
Pre Buerger Exercise	0.8300	0.0503	0.0075
Post Buerger Exercise	0.9825	0.0170	0.0075
Post Ratschow Exercise	0.8500	0.1052	0.0474
Post Buerger Exercise	0.9825	0.0170	0.0474

All tests have $p < 0.05$, so result are significant

RESULT

PURPOSE	TEST	SET P VALUE	INFERENCE
Comparison of pre and post Ratschow Exercise	Paired t test	0.0219	Significant
Comparison of pre and post Buerger Exercise	Paired t test	0.0075	Very Significant
Comparison of post-post Ratschow and Buerger Exercise	Unpaired t test	0.0474	Significant

DISCUSSION:

Current study was to compare the effect of 7 week of Ratschow exercise v/s buerger exercise on ankle brachial index in patients with peripheral arterial disease.

A total 8 individual with PAD participated in the study. The result of the study showed that Buerger exercise is more effective than Ratschow exercise. Mean value of pre ABI in Ratschow exercise is 0.775, post ABI is 0.85 and in Buerger exercise pre ABI is 0.83, post ABI is 0.982 and show p value 0.0474 which considered to be significant.

The study included participants with peripheral arterial disease were both male and female.

Ratschow Exercise were compare with paired t-test the pre and post ABI which showed p value < 0.0219 which is considered significant. Buerger Exercise were compare the pre and post ABI which showed p value < 0.0075 which is considered very significant. Post Ratschow Exercise and Post Buerger Exercise were compare which showed p value < 0.0474 which is considered significant. P value < 0.05 which is statistically significant. P value < 0.05 which is statistically significant. Current study concluded that Buerger exercise showed very significant improvement in peripheral circulation of lower extremities. It includes placing the extremities in three position in which first step of buerger exercise, gravity causes an emptying of the veins and increases the inflow of the right atrium, which subsequently promotes cardiac output. In the second step, gravity still plays role in increasing inflows of the arterioles and the following ankle movement may reinforce peripheral circulation due to the force of muscle contraction. The final step is to lie down on supine position, which can improve leg reperfusion when the gravity effects are withdrawn. Ratschow exercise showed significant improvement which promotes collateral circulation in which placing the extremity in two positions in a series of positional change of the affected limb from elevation to a dependent position.

Buerger exercise showed very significant improvement in Ankle Brachial Index. Hence, Buerger exercise was more effective Ratschow exercise.

Chan Cheng Chang et all study the effect of Buerger Exercise on improving peripheral circulation: A systematic review , the study concluded that buerger exercise is beneficial for PAD patients with post-operative orthopedic and gynecological problems by improving local circulation.

Thenmozhi et all concluded a study to assess the effectiveness of Allen buerger exercise in preventing peripheral arterial disease the study concluded that there is a significant improvement in ankle-brachial index score in preventing peripheral arterial disease. The participants got benefit by allen buerger exercise in preventing Peripheral Arterial Disease.

Tato kawasaki et all concluded a study to assess the effect of buerger allen exercise on lower limb skin perfusion pressure the concluded that the sitting position is effective to keep good blood stream of lower limbs not only in healthy adults but also in patients with critical limb ischemic.

In Conculsion the current study proves that Buerger exercise is more better than Ratschow exercise to improve the ABI value in Peripheral arterial disease.

CONCLUSION

The present study concluded that,

Buerger exercise is more effective than Ratschow exercise on ankle brachial index in patients with peripheral arterial disease.

REFERENCE

1. Jun shu and Gaetano Santuli; (2018) Update on peripheral artery disease :Epidemiology and evidence based facts.
2. Chyong – fang chang 1, chang –cheng chang 2, et al; Effect of buerger's exercise on improving peripheral circulation :A Systematic review.
3. Parimala L , Vishnu Priya .U: Assess the effectiveness of Buerger Allen Exercise to reduce pedal edema among the adults with varicose veins at Saveetha Medical College and hospital.
4. Jeffrey w. Olin, DO and Brett; Peripheral artery disease: Current Insight into the disease and its diagnosis and management.
5. Susan B. O' Sullivan. Thomas J. Schmitz. George D. Fulk: Physical Rehabilitation 6th edition; p-586.
6. Sharmista Sarangi, Banumathy Srikant; (2012) Correlation between peripheral arterial disease using ankle brachial index- a study in indian population.
7. Subin Solomen , Pravin Aaron : Vascular rehabilitation ;p- 111 – 113
8. Vijay A Doraiswamy , MD, Jay Giri , MD : Premature peripheral arterial disease – difficult diagnosis in very early presentation .
9. Duane R. Hennion , MD, Kelly A. Siano ,MD : Diagnosis and treatment of peripheral arterial disease.
10. Marius RAC-ALBU , Luminita ILIUTA, : The role of ankle brachial index for predicting peripheral arterial disease.
11. Guidelines for rehabilitation in patients with cardiovascular disease.(JSC 2012)
12. Susan B. O' Sullivan. Thomas J. Schmitz. George D. Fulk: Physical Rehabilitation 4th edition ;p-596.
13. Daniel Benchimol , Jacques Bonnet ; Accuracy of ankle brachial index using an automatic blood pressure device to detect peripheral artery disease in preventive medicine.
14. McClary KN, Massey p. : Ankle Brachial Index (ABI).
15. Sean P Heffron et al. : Body mass index and peripheral artery disease.